Bacterial infections in the urinary tract

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BACTERIAL INFECTIONS IN THE URINARY TRACT

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Urinary tract infections (UTIs) are usually caused by bacterial organisms; however fungi and viruses may also infect the urinary tract (1). Bacterial UTI is said to occur in about 14% of all dogs at some time during their life (2). In cats the prevalence has not been defined but has been estimated in the range of 0.1 to 1% and at least 10 times less than the estimated prevalence in dogs (3). It was reported that 1% of cats admitted to veterinary teaching hospitals were diagnosed with UTI. Infection can occur either in the upper or the lower urinary tract or in both sites at once. It might sometimes be difficult to detect the location of an infection. Furthermore an infection in one part of the urinary tract increases the likelihood of another part of the urinary tract becoming infected as well (1). Most UTIs are the result of ascending migration of pathogens from the distal urogenital tract to the sterile part. UTI develops when the host's defenses are overwhelmed by microbes. Normal defenses include normal micturation, anatomic properties (e.g. urethral peristalsis), mucosal defense barrier (e.g. glycosaminoglycan layer), antimicrobial properties of urine (e.g. extreme pH), and systemic immunocompetence.

UTI is usually caused by one single bacterial species (1). Predominant bacterial species are *E. coli*, followed by gram-positive cocci (*Staphylococcus spp.*, *Streptococcus spp.*, *Enterococcus spp.*).

Typical clinical signs of lower UTI are stranguria, pollakiuria, and hematuria. Infections of the upper urinary tract may cause abdominal pain or clinical signs caused by septicemia or renal failure (1). Asymptomatic bacteriuria or asymptomatic

UTI in human beings is defined by a specified quantitative count of bacteria in a urine specimen from a person without symptoms or signs relating to UTI (4). Asymptomatic bacteriuria is also common in animals and it is difficult to localize it in either the upper or the lower urinary tract (1). It is often seen in animals with compromised host defense, such as those with glucocorticoid excess or diabetes mellitus.

The gold standard for diagnosis of UTI is urine culture. Examination of the urine sediment provides some help in the identification of UTI. More than 4 white blood cells per 400X field in unstained sediment under a cover slip together with bacteria identified during the same examination are indicatives. However the presence of pyuria represents any inflammation and is not synonymous with UTI. The absence of pyuria does not rule out UTI. The presence of bacteria might represent contamination or amorphous particles resembling bacteria. Cystocentesis is the preferred method of urine collection for culture, because lower genitourinary tract contamination is avoided (1).

Administration of antimicrobial agents should be based on susceptibility testing. Fortunately most antimicrobials are present in urine in high concentrations as a result of renal excretion. Which means even if an antibiotic is used to which the organism is reported to be resistant a good result may be obtained in an animal that can concentrate the urine. An antimicrobial is said to be effective if the urine concentration reaches four times the minimum inhibitory concentration (MIC). Empirical treatment is often necessary before culture and sensitivity results are available. It is recommended to start antibiotic therapy in uncomplicated urinary tract infections with amoxicillin or trimethoprim-sulfonamide (5). However local resistance patterns might influence the choice. If results of culture and sensitivity testing indicate in vitro resistance of the bacterial isolate against the chosen antimicrobial agent therapy can be switched to an appropriate antimicrobial agent; however if clinical signs resolved, the chosen antimicrobial can be maintained. Not much is known about the appropriate duration of treatment but seven days were considered reasonable in absence of evidence. In most instances asymptomatic bacteriuria should not be treated (5). Complicated UTIs are UTIs of animals with anatomic or functional urinary tract anomalies or identifiable predispositions for recurrent or persistent UTIs (e.g. diabetes mellitus, renal failure). In these animals treatment for a

longer period than the routine 7 days may be indicated (up to 4 weeks). In these cases it may also be indicated to test the urine after the first week of treatment to evaluate the response to therapy, and after the end of treatment to make sure that no more bacteria are present. Treatment of UTI is usually successful and nearly 75% of infections remain single episodes (3). Recurrent UTIs (three or more episodes within 12 months) might either be caused by the same organism which was isolated before treatment (relapse) or by a different organism (reinfection). In both cases further work up is required to identify the underlying causes. If predisposing disorders are not addressed, control of UTI will be poor. Reasons for poor response to therapy might be treatment of a non infectious problem with antibiotics, infectivity of the antibiotics because of inadequate delivery (poor client compliance, poor patient acceptance, ineffective drug or impaired drug transport), resistant microbes or super infection with another organism.

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Anschrift des Verfassers

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